computer readable form and paper form are the same, and that no new matter is thereby added.

Applicants further note than an Information Disclosure Statement was submitted on March 15, 2000.

Applicants traverse the rejection of Claim 1 under 35 USC 112, second paragraph on the grounds that the terms "part-sequence" and "immunoreactivity" are indefinite. The traversal stems from the fact that the term "part-sequence" finds support in the specification. In this regard, Applicants direct the Examiner's attention to page 3, lines 21-25 of the specification, which states that:

> "It has now been found that FMDV vaccines can be prepared based on peptides having a sequence of at least 8 amino acids, which corresponds to a partial sequence of the non-structural protein region of FMDV, which was selected by immunoreactivity with FMDV-specific antibodies or by immunoreactivity with FMDV-specific T lymphocytes."

The term "immunoreactivity" which was also cited as a basis for rejecting Claim 1 is defined by the specification at page 5, lines 4 -10, as follows:

> "Immunoreactivity in this connection is understood as meaning the reactivity with FMDV-specific antibodies. The detection of a reaction is in this case carried out by means of an interaction of the FMDV-specific antibodies with the peptides bound to a solid phase via an enzyme immunoassay which includes a colour reaction. A further possibility of detecting the reactivity consists in the detection of the competition of the binding of the FMDV-specific antibodies to recombinant viral proteins by the peptides concerned.
>
> "Immunoreactivity is also understood as meaning the reactivity of the peptides with lymphocytes which were obtained from FMDV-infected/vaccinated animals. After co-incubation with the peptides concerned, these lymphocytes are able to exhibit specific reactions: a) increased peptide concentration-dependent growth (a peptide antigen-specific proliferation); b) a peptide-specific increased production of specific substances (cytokines, e.g. interleukin-2); c) and also differentiation to give virus-specific cytolytic T lymphocytes which are able to recognize the peptides concerned in association with molecules which are encoded by the major histocompatibility complex (MHC), and to lyse cells which carry the peptides concerned on the surface."

From the foregoing, the terms "part-sequence" and "immunoreactivity" would be understood by the skilled artisan in ascertaining the metes and bounds of the claim.

Therefore, the claims meet the requirements of the second paragraph of 35 USC 112. Applicants, therefore, pray for the withdrawal of the rejection.

Claims 4, 5, 13 and 14 are rejected as not being clear as to whether the DNA sequences or protein sequences encompassing the non-structural proteins L/L, 2B, 2C, 3A, 3B and 3D are claimed. Applicants have overcome the rejection by the amendments to the claims, reciting the invention more clearly and distinctly.

Claims 24-27 stand rejected under 35 USC 101 because the claimed invention is directed to non-statutory subject matter due to the use of the term "system". Applicants have overcome the rejection by amending the claims to substitute the term "article of matter" therefor.

Applicants traverse the rejection of the claims under 35 USC 103 because the rejections fail to satisfy the required elements for a prima facie case of obviousness. Applicants discuss more fully hereunder the rejections, reasons therefor and Applicants' arguments overcoming the rejections.

Claims 1-8 and 13-21 stand rejected under 35 USC 103(a) as being unpatentable over Zamorano et al. (Virology 1995) and Rodriguez et al. (Arch. Virol. 1994). Claims 1-8 and 13-21 stand further rejected under 35 USC 103(a) as being unpatentable over Zamorano et al. and Rodriguez et al. in view of Morgan et al. (Am J. Vet. Res. (1990). Also, the claims stand rejected under 35 USC 103(a) as being unpatentable over Zamorano et al. and Rodriguez et al. in view of Lubroth et al. (Vaccine 1996).

Bases for the rejection are stated as follows:

> "Zamorano et al. teach that peptide-based vaccines can elicit B- and T-cell immune responses. The peptides in the reference are 10 amino acids in length and they correspond to amino acids residues of the VP1 structural protein sequences of FMDV. Zamorano et al. also teach that the peptides in the test vaccines can be used with or without a coupled protein carrier."

In point of fact, Zamorano et al relates to using a set of synthetic 10mer polypeptide which cover the entire sequence 135-160 of VP1 structural peptide to show that at least four discrete B epitopes as neutralizing sites that are regularly distributed along the peptide.

Contrasting the teaching of Zamorano et al with the claimed invention, the Office Action states and Applicants agree that:

> "Zamorano et al. do not teach making peptides against non-structural proteins of FMDV."

Rodriguez et al is cited for the proposition that they teach that

> "... animals that have been immunized with killed whole FMDV vaccine produce a different antibody profile when compared to animals that have recovered from an active viral infection. Animals that have recovered from an active infection are more resistant to reinfection when challenged with the same viral strain as compared to animals that have been vaccinated. The major differences between vaccinated and convalescent animals are their antibody profiles. Convalescent animals produce antibodies against the non-structural proteins (see Fig 3). To test serum samples, Rodriguez et al. made peptides of the non-structural proteins using recombinant DNA technology."

Here again the Office Action notes and Applicants agree that:

> "Rodriguez et al. does not teach making peptide based vaccines."

Yet, the Office Action concludes that:

> " ... One would have been motivated at the time the invention was filed to produce a peptide-based vaccine that is able to elicit the same immune profile as that of convalescent animal by directing peptides against the non-structural proteins."

Contrary to this conclusion, Rodriguez et al poignantly states that "[C]onversely to the use of whole virus, the use of polypeptide 3ABC [non-structural proteins] did not allow detection of significant levels of antibodies in sera from vaccinated animals." See the Summary of Rodriguez et al at lines 9-10. Applicants submit that the skilled artisan would, therefore, be hard pressed to conclude that Rodriguez et al suggests the use of non-structural proteins - which did not allow detection of significant antibodies - would be useful for vaccines.

As such the alleged prima facie case of obviousness lacks two required elements. The case lacks the element that the prior art knowledge provide a suggestion that would have led the skilled artisan to combine prior art references, In re Fine 5USPQ2d 1596 (CAFC 1988). Further, the case lacks the element of reasonable expectation that the proposed combination would have a reasonable

expectation of success. Amgen v. Chugai Pharmaceutical Co. 18 USPQ2d 1016 CAFC 1991). Since all the elements of prima facie obviousness are not met, Applicants pray for the withdrawal of this rejection.

Applicants traverse the further rejection of Claims 1-8 and 13-21 under 35 USC 103(a) as being unpatentable over Zamorano et al. and Rodriguez et al. in view of Morgan et al. The traversal stems from the failure of Morgan et al to cure the afore-described deficiency or Rodriguez et al and Zamorano et al.

Morgan et al teaches protection of cattle and swine against FMDV using biosynthetic peptide vaccines comprising a virus protein 1 (VP1) peptide (structural protein) expressed in E. Coli as a fusion protein with 190 amino acids (AA) of the LE' protein of the tryptophan of E. Coli. It is open to question whether the reference disclosing a fusion protein of VP1 structural protein with 190 amino acids is combinable with Rodriguez et al and Zamorano et al. Assuming that the references can be combined, the Examiner will surely agree that the fusion protein of structural protein with 190 amino acids is not suggestive of the vaccines containing non-structural peptides as recited by the claims. Therefore, the prima facie case of obviousness does not meet the requirements of providing a suggestion that would have led to the claimed invention with a reasonable expectation of success. Applicants therefore pray for the withdrawal of the rejection.

Applicants also traverse the rejection of Claims 1-8 and 13-21 under 35 USC 103(a) as being unpatentable over Zamorano et al. and Rodriguez et al. in view of Lubroth et al. The traversal is based on the grounds that Lubroth et al does not cure the shortcomings of Rodriguez et al and Zamorano et al in failing to teach or suggest vaccines based on non-structural proteins as recited by the claims. The teaching of Lubroth et al, as the Office Action notes correctly, relates to a method of distinguishing between vaccinated and convalescent cattle. Neither vaccines base on non-structural proteins nor the method of making or using the same is disclosed by Lubroth et al.

For the same reasons as stated above, the case for prima facie obviousness fails to satisfy the requirements for a suggestion compelling the proposed modification with a reasonable expectation of success. Therefore, Applicants pray for the withdrawal of the rejection.

In view of the foregoing amendments and discussions, Applicants submit that the claims are patentably distinct over the prior art and the Examiner is justified in allowing them.

Respectfully submitted,

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